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 VISSING, G.S.

SUBJECT: Forwards RE Ginna Nuclear Power Plant Simulator Four Yr
 Certification Rept, IAW 10CFR55.45(b)(5)(ii).

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February 12, 1999

U.S. Nuclear Regulatory Commission
Document Control Desk
Attn: Guy S. Vissing
Project Directorate I-1
Washington, D.C. 20555

SUBJECT: Simulator Facility Certification Four Year Report
R.E. Ginna Nuclear Power Plant
Docket No. 50-244

Dear Mr. Vissing:

In accordance with 10CFR55.45 (b) (5) (ii), we hereby submit the R.E. Ginna Nuclear Power Plant Simulator Four Year Certification Report.

Very truly yours,


Robert C. Mecredy

xc Mr. Guy S. Vissing (Mail Stop 14B2)
Project Directorate
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulations
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R.E..GINNA NUCLEAR POWER PLANT SIMULATOR FOUR YEAR REPORT

- I. Pursuant to 10CFR55.45(b)(5)(ii), all performance test failures have been corrected. All discrepancies noted during performance testing are identified, prioritized, and corrected per procedure GSS-1.4, "Simulator Discrepancy Reporting". Identified performance testing discrepancies have been corrected with the exception of the following , which will be resolved per the above referenced procedure:

SDR # 97-80 H2 Temp Controller Demand Low Compared to Plant Data (Priority 4)
98-24 Transformer 14,16,17, & 18 Response to Loss of DC (Priority 2)
98-63 CCW HX Outlet Temp Increases When CCWP is Off (Priority 3)
98-65 HDT Pump Trip From 100% Should Require Power Reduction (Priority 3)
98-74 PCV 434/435 Should Be Powered From Bus 13 Lighting Panel (Priority 3)

- II Pursuant to 10CFR55.45(b)(5)(vi), the following is a description of the simulator performance testing completed satisfactorily during the previous four (4) year test period, January 1995 - January 1999.

1. Performance testing was conducted each year in accordance with ANSI/ANS 3.5 1985, Section 5.4, "Simulator Testing" and Appendix A Section A3 "Simulator Tests" as follows:
- A. 14.3.2 Computer Real Time Test (Appendix A Section A3.1)
 - B. 14.3.1 Instructor System Test (Section 3.3.2, 3.4)
 - C. Steady State and Normal Operations Tests (Appendix A Section A3.2 and Appendix B Section B2.1):
 - 14.4.1 Operating Limits Monitoring
 - 14.4.2 Normal Operations Acceptance Test
 - 14.4.3.1 100% BOL Steady State Accuracy Test
 - 14.4.3.2 100% Power Steady State Drift Check
 - 14.4.3.3 Instrument Error Certification
 - 14.4.3.4 Initial Conditions Stability Check
 - 14.4.4.1 NSSS-BOP Energy Balance Test
 - 14.4.5.1 NSSS-Mass Balance Test
 - 14.4.5.2 BOP-Mass Balance Test

D. Transient Tests (Section 5.4.2, Appendix A Section A3.3, and Appendix B Section B.2.2)

The transient test parameters were compared with reference plant data where available, or best engineering estimate when plant data was not available, by a Transient Review Committee (TRC). The TRC verified the test results were satisfactory with ANSI/ANS 3.5 1985, Section 4.2.1 Performance Criteria.

- 14.4.8 BE 1 Manual Reactor Trip
- 14.4.8 BE 2 Simultaneous Trip of All Feedwater Pumps
- 14.4.8 BE 3 Simultaneous Closure of Both MSIV's
- 14.4.8 BE 4 Simultaneous Trip of Both RCP's
- 14.4.8 BE 5 Single RCP Trip
- 14.4.8 BE 6 Main Turbine Trip
- 14.4.8 BE 7 Maximum Rate Power Ramp
- 14.4.8 BE 8 Maximum Size RCS Rupture with Loss of all Offsite Power
- 14.4.8 BE 9 Maximum Size Unisolable Main Steam Line Rupture
- 14.4.8 BE10 Slow RCS Depressurization Using PORV or Safety .
(Activation of ECCS Inhibited)
- 14.4.8 BE11 Steam Generator Tube Rupture

2. The following performance test was conducted after each reference plant core refueling (1995, 1996, 1998) and evaluated against the reference plant physics testing data in accordance with ANSI/ANS 3.5 1985, Section 5.4, "Simulator Testing".

14.4.6.1 Startup Test - Initial Criticality and Low Power Physics Tests

3. Performance tests scheduled at an approximate rate of 25% per year in accordance with the NRC Form 474 submittal of February 15, 1995 were completed. Discrepancies identified, other than those listed in Section I , were corrected in accordance with procedure GSS-1.4, "Simulator Discrepancy Reporting". All tests satisfactorily meet ANSI/ANS 3.5 1985 , Section 4, Performance Criteria.

A. System Tests

The System Tests verify the modeling of plant systems at a level of detail greater than the normal operations tests, and also include those surveillance tests conducted by control room operators, in accordance with ANSI/ANS 3.5 - 1985 Section 3.1.1 (10).

The following System Tests were inadvertently omitted from previous test schedules, but have been recently completed with satisfactory results. In accordance with our internal reporting process, procedure IP-CAP-1, Abnormal Condition Tracking Initiation or Notification (ACTION) Report, ACTION Report # 99-0159 has been submitted for these items.

Standby Aux Feedwater System Test (Test # 14.3.4.19)
Test completed January 1999, previous test completed 1990.

Electrical Distribution Test (Test # 14.3.6.1)
Test completed December 1997, previous test completed 1991.

B. Malfunction Tests

Malfunction Tests verify the response of the simulator in real time to demonstrate inherent plant response and automatic plant control functions. (ANSI/ANS 3.5 1985, Section 3.1.2, Section 4.2.2, Appendix A Section A3.4).

During the previous four year test period, January 1995 - January 1999, the following malfunctions were deleted:

MIS-7	Loss of Plant Communication (Malfunction was never used. Determined to have no training value)
STM-12	MSR Tube Rupture (Malfunction not used for training. No actual simulator response noted or predicted.)

The following Malfunction Tests were performed during the previous four year test period. These tests were either the result of new malfunctions or malfunctions that were not part of the initial certification package.

14.4.7.4.16	Seal Water Return Line Safety Valve Failure
14.4.7.4.20	Aux Spray Valve Failure
14.4.7.6.3	Feedwater Recirculation Valve Failure
14.4.7.7.2	Failure of Generator H2 Temperature Sensor
14.4.7.7.9	Diesel Generator Breaker Failure to Close
14.4.7.8.1	Feedwater Heater Tube Leak
14.4.7.8.5	Feedwater Heater Level Control Failure
14.4.7.9.3	Liquid Radwaste Leak

14.4.7.9.4	Gas Decay Tank Rupture
14.4.7.12.4	Reactor Vessel Flange Leak
14.4.7.12.20	Failure of AVG Tavg Channel
14.4.7.14.3	Nuclear Sample Room Radiation Level
14.4.7.15.14	Inadvertent MRPI Alarms
14.4.7.15.17	Rod Motion Reverse Logic
14.4.7.16.4	Spray Additive Tank Leak
14.4.7.19.7	Extraction Steam Non-Return Valve Failure
14.4.7.19.8	Gland Seal Steam Regulator Failure
14.4.7.20.13	Turbine Auxiliary Governor Failure
14.4.7.20.14	LP Turbine Relief Valve Failure
14.4.7.20.15	Reheater Control Valve Failure
14.4.7.20.17	Failure of Turbine Auto Load Pickup

4. In accordance with ANSI/ANS 3.5 1985, Section 5, Simulator Design Control and Section 5.4.1, Simulator Performance Testing, configuration changes made to the reference plant were evaluated, installed, and tested. The changes listed below, were implemented in the simulator during the previous four (4) year reporting period. Acceptance tests procedures were performed for each modification with satisfactory results in accordance with ANSI/ANS 3.5 1985, Section 5.4.1 prior to turnover to Nuclear Training.

SIMULATOR
MODIFICATION #

TITLE

94-03	Recorder Replacement Phase 2
94-08	Main Feed Reg Valve Trim
94-19	PPCS Build 94.1
94-21	PPCS Operating System Upgrade
94-28	N32 & N32 Source Range Detector Replacement
94-31	PPCS Build 94.2
94-32	Steam Generator Replacement
95-01	SASS Upgrade
95-02	PPCS Build 95.1
95-04	SASS Upgrade
95-09	Condensate Low Pressure Drop Alarm
95-10	RCP Seal Leakoff Flow Setpoints
95-11	Annunciator Window J-19
95-12	Delta T Runback Logic Change
95-13	Reprogram Simulator Phone Numbers
95-14	Deletion of BAST/RWST Swapover Logic
95-15	AFW Lube Oil Pump Alarm

95-16	CRDM Fans Damper Failure on Loss of Instrument Air
95-18	PPCS Build 95.2
95-19	RMS Rack Overheat Correction
95-20	SASS Version 95.2
95-22	Incore Thermocouple Panel Reprogramming
95-24	SASS Modification - NERP Display and Message Center
95-25	SWP D Motor Replacement
95-26	Instrument Air Compressor "C" Replacement
96-01	Reactor Makeup Water Control Setpoint
96-02	RCP & Turbine Generator Vibration Monitoring
96-05	Replacement of Instrument Bus Voltmeters
96-06	SASS Update 96.1
96-07	RCP Seal Leakoff Flow Transmitters
96-08	PPCS Build 96.1
96-09	SGRP - FW Isolation Setpoint Change
96-10	SASS Update dated 6/14/96
96-12	Reactor Compartment Cooling Unit Discharge
96-13	Removal of CRDM Fan Suction Dampers
96-14	Main Generator Voltage Reg Auto-Man Transfer Circuit Fuse Indication
96-17	SI Rack DC Power Reconfiguration
96-21	N31 Detector Replacement
96-22	Pressurizer Spray Valve Indication
97-02	PPCS Update for NERP
97-03	RVLIS Setpoint Correction
97-05	FW Pump AB Seal Drain Tank Hi Level Alarm Defeat
97-07	Remove Low Pressurizer Pressure Trip Rate Function
97-08	Electrical Power Feed to AFW Actuation Relays
98-02	PPCS Build 97.1
98-03	Removal of Recorder RK-17
98-04	Reversal of Power & Control Feeds for MOV 515 & 516
98-05	Safety Related Indicator Replacement for D/G's
98-07	Disable CETs
98-09	CET Display Panel
98-16	EH Controller Speed Error 'B' Card Replacement
98-17	Remove CV Isolation Signal from AOV-9227
98-18	Remove Electrical Power from MOV-5171

5. In accordance with ANSI/ANS 3.5 1985, Section 5, Simulator Design Control and Section 5.4.1, Simulator Performance Testing, enhancements recommended for simulator performance were evaluated, installed, and tested. The enhancements listed below, were implemented in the simulator during the previous four (4) year reporting period. Acceptance tests procedures were performed for each modification with satisfactory results in accordance with ANSI/ANS 3.5 1985, Section 5.4.1 prior to turnover to Nuclear Training.

<u>SIMULATOR MODIFICATION #</u>	<u>DESCRIPTION</u>
91-51	Add LOA to Adjust NIS Trip Setpoints
92-08	Add LOA's for Local Positioning of MOV's
92-25	Ability to Flag Non-Certified LOA's, MALF's, & IC's
92-26	Alert Instructor to I/O Lockup Problem
93-14	Add Ability to Block Snapshot Data From PPCS
93-25	Enhance MALF STM-5 to Allow Partial Closure
93-37	Add MALF Failure of D/G Output Breaker to Close
93-38	Add MALF Failure of AVG TAVG Signal
94-09	Add MALF Failure of Turbine Auto Load Pickup
94-12	Prevent Reset of Bank 'C' Step Counters on Init
94-13	Enhance MALF HTR-4 for Dump Valves to Fail Open
94-14	Expand Scope of Sim to Reflect Siphoning
94-22	Expand Range of MALF RCS-11, RTD Failure
94-33	Add LOA's for Diesel Driven Air Compressor
94-34	Upgrade Simulator & Spare Instructor Interface
95-07	Add MALF for Opposite Rod Movement
95-08	Simulator Computer Upgrade
95-21	Enhance Main Condensers to Respond to Backpressure
95-23	Instructor Print Screen to Line Printer Operation
95-28	Determine Setpoints for AOV's to Fail Closed
95-29	Remove Control Board Chart Marking Feature
96-03	Add LOA for Hooking Up Cooling From Fire Water System to Diesel Generator
96-04	Remove Status of Remote Control PB's from Switch Check
96-15	Core Cycle 26 Update

98-01	Install RSX YEAR-2000 Software on RSX's, PPCSS, & SASS
98-06	Enhance Cycle 26 Core to Plant Cycle 27 Data
98-10	Add LOA to Defeat Jumpers for AFW Bypass Valves Lo Lo Lvl Closure

- III Pursuant to 10CFR55.45 (b)(5)(vi), the performance test schedule for the subsequent four (4) year period (January 1999 - January 2003) is provided in Attachment 1. This schedule includes computer real time tests, steady state and normal operations tests, system tests, transient tests, and malfunction tests. The system tests verify the modeling of plant systems at a level of detail greater than the normal operations tests, and also include those surveillance tests conducted by control room operators, in accordance with ANSI/ANS 3.5 1985 Section 3.1.1 (10). Additional tests for acceptance of simulator modifications due to plant configuration changes and simulator enhancements will be conducted as needed.

ATTACHMENT 1

FOUR YEAR TEST PLAN - (January 1999 - January 2003)

A. ANNUAL TEST SCHEDULE

14.3.1	Instructor System Test
14.3.2	Computer Real Time Test
14.4.1	Operating Limits Monitoring
14.4.2	Normal Operations Acceptance Test
14.4.3.1	100% BOL Steady State Accuracy Test
14.4.3.2	100% Power Steady State Drift Check
14.4.3.3	Instrument Error Certification
14.4.3.4	Initial Conditions Stability Check
14.4.4.1	NSSS - BOP Energy Balance
14.4.5.1	NSSS Mass Balance Test
14.4.5.2	BOP Mass Balance Test
14.4.8 BE 1	Manual Reactor Trip
14.4.8 BE 2	Simultaneous Trip of All Feedwater Pumps
14.4.8 BE 3	Simultaneous Closure of Both MSIV's
14.4.8 BE 4	Simultaneous Trip of Both RCP's
14.4.8 BE 5	Single RCP Trip
14.4.8 BE 6	Main Turbine Trip
14.4.8 BE 7	Maximum Power Rate Ramp
14.4.8 BE 8	Maximum Size RCS Rupture With Loss of All
14.4.8 BE 9	Maximum Size Unisolable Main Steamline Rupture
14.4.8 BE 10	Slow RCS Depressurization using PORV or Safety
14.4.8 BE 11	Steam Generator Tube Rupture

B. TEST SCHEDULE - YEAR 1

14.3.3.4	Bistable Handler Test
14.3.3.5	Alarm Handler Test
14.3.4.12	EHC, TGA, and Main Generator System Test
14.3.4.16	Circulating Water System Test
14.3.4.20	Service Water System Test
14.3.4.23	Process & Area Radiation Monitor System Test
14.3.4.25	SAS Fidelity Test
14.3.4.4	Reactor Coolant System Test
14.3.4.7	RHR System Test
14.4.6.1	Startup Test-Initial Criticality & Low Power Test

14.4.7.1.2	Loss of Lake Water
14.4.7.10.3	Failure of Source Range Channel High Voltage to Disconnect
14.4.7.10.6	Power Range Channel Detector Failure
14.4.7.10.9	Source Range High Voltage Failure
14.4.7.11.3	Pressurizer Level Channel Failure
14.4.7.12.13	RCP No. 2 Seal Failure
14.4.7.12.16	Fuel Cladding Failure
14.4.7.12.19	RCS Leaks Outside Containment
14.4.7.12.20	Failure of AVG Tavg Channel
14.4.7.12.3	RCS DBA into Containment
14.4.7.12.5	RCP Trip
14.4.7.12.9	Wide Range RCS Pressure Channel Failure
14.4.7.13.1	RHR Pump Trip
14.4.7.13.5	RHR Bypass Line Leak
14.4.7.15.12	Rod Stop Failure
14.4.7.15.16	Misaligned Rod Failure
14.4.7.15.17	Rod Motion Reverse Logic
14.4.7.15.4	Control Banks Fail to Move
14.4.7.15.8	Rod Speed Controller Failure
14.4.7.16.2	Inadvertent Control Room Environmental Isolation
14.4.7.16.6	Containment Fails to Isolate
14.4.7.16.9	Inadvertent Containment Ventilation Isolation
14.4.7.17.3	Steam Generator Pressure Channel Failure
14.4.7.17.4	Steam Generator Tube Rupture
14.4.7.18.4	RWST Leak
14.4.7.19.2	Steamline Break Outside Containment Upstream of MSIVs
14.4.7.19.6	Main Steam Header Pressure Transmitter Failure
14.4.7.2.10	CCW Pump Low Pressure Autostart Failure
14.4.7.2.3	Non-regenerative Letdown HX Tube Leak
14.4.7.2.7	CCW Heat Exchanger Tube Leak
14.4.7.2.9	Service Water Pump Discharge Check Valve Failure
14.4.7.20.1	Inadvertent Turbine Trip
14.4.7.20.17	Turbine Stop Valve Failure
14.4.7.20.18	Failure of Turb Auto Load Pickup
14.4.7.20.5	Turbine High Vibration
14.4.7.3.4	Condensate Pump Failure
14.4.7.3.8	Condensate Pipe Break
14.4.7.4.12	Charging Pump Trip
14.4.7.4.19	Plugged Seal Injection Filter
14.4.7.4.24	Charging Backpressure Control Valve Failure
14.4.7.4.4	Makeup Control Failure in All Modes
14.4.7.4.8	RCS Filter Plugged
14.4.7.5.1	Loss of Off-Site Power

14.4.7.5.5	Loss of DC Bus
14.4.7.6.13	AFW Pump Suction Line Break
14.4.7.6.17	Main Feedwater Pump Fails to Trip
14.4.7.6.4	Feedwater Pump Lube Oil System Failure
14.4.7.6.5	Feedline Leak Between Flow Element & Check Valve
14.4.7.7.4	Diesel Generator Trip
14.4.7.9.9	Turbine Building Fires

C. TEST SCHEDULE - YEAR 2

14.3.3.1	Valve Handler Test
14.3.4.1	Nuclear Instrumentation System Test
14.3.4.13	Condensate and Main Feedwater System Test
14.3.4.17	Compressed Air System Test
14.3.4.21	Plant Protection System Test
14.3.4.9	Component Cooling Water System Test
14.3.6.2	Electrical Interlocks
14.4.7.1.3	CWS Leak
14.4.7.10.10	Source Range Blown Fuse
14.4.7.10.7.1	Power Range Channel Fails High
14.4.7.11.4	Pressurizer Master Controller Failure
14.4.7.11.7	Pressurizer Steam Space Leak
14.4.7.11.9	Pressurizer Instrumentation Line Breaks
14.4.7.12.10	RCS Loop Flow Transmitter Failure
14.4.7.12.14	RCP No. 3 Seal Failure
14.4.7.12.2	RCS Leak into Containment
14.4.7.12.4	Reactor Vessel Flange Leak
14.4.7.12.6	RCP Shaft Shear
14.4.7.13.2	RHR Heat Exchanger Flow Control Valve Failure
14.4.7.13.6	Containment Sump to RHR Pump Screens Foul
14.4.7.14.3	Nuclear Sample Room Radiation Level
14.4.7.15.1	Uncontrolled Rod Motion
14.4.7.15.5	Rod Ejection
14.4.7.15.9	Improper Bank Overlap
14.4.7.16.3	Containment Spray Pump Trip
14.4.7.16.4	Spray Additive Tank Leak
14.4.7.17.1.1	S/G Level Channel Failure - High
14.4.7.18.1	Inadvertent SIS Actuation
14.4.7.18.5	Accumulator Leak
14.4.7.19.10	Steam Dump Failure
14.4.7.19.3	Steamline Break Outside Containment Downstream of MSIVs
14.4.7.2.4	Loss of CCW to RHR Heat Exchanger

14.4.7.2.8	Service Water Leaks
14.4.7.20.10	AMSAC Failures
14.4.7.20.13	Turbine Auxiliary Governor Failure
14.4.7.20.2	Turbine Failure to Auto Trip
14.4.7.20.6	Turbine Lube Oil Temperature Control Valve Failure
14.4.7.20.9.1	Turbine EHC Failure - EHC Leak
14.4.7.20.9.2	Turbine EHC Failure - Electronic Failures
14.4.7.3.1	Condensate Booster Pump Trip
14.4.7.3.7	Loss of Condenser Vacuum
14.4.7.4.1	Letdown Line Leak Inside Containment
14.4.7.4.13	Boric Acid Pump Trip
14.4.7.4.16	Seal Water Return Line Safety Valve Fails
14.4.7.4.17	RMW to Blender Flow Control Valve Failure
14.4.7.4.20	Aux Spray Valve Failure
14.4.7.4.21	Boric Acid Storage Tank Leak
14.4.7.4.25	VCT H ₂ Pressure Control Valve Failure
14.4.7.4.26	VCT Outlet Pipe Ruptures Upstream LCV-112C
14.4.7.4.5	Loss of CCW to NRHX
14.4.7.4.9	VCT Divert Control Valve Failure
14.4.7.5.2	Loss of Station Service Transformer
14.4.7.5.6	Loss of Switchyard (Station Blackout)
14.4.7.6.10	Feed Regulating Valve Failure
14.4.7.6.14	AFW Feed Control Valve Failure
14.4.7.6.19	ADFCS Controllers Fail to Manual
14.4.7.6.2	Feedwater Pump Trip
14.4.7.6.3	Feedwater Recirculation Valve Failure
14.4.7.6.6	Feed Flow Transmitter Failure
14.4.7.6.9	Feedwater Break Inside Containment
14.4.7.7.1	Main Generator Trip
14.4.7.7.2	Failure of Generator H ₂ Temperature Sensor
14.4.7.7.5	Diesel Generator Failure to Load
14.4.7.8.3	Heater Drain Tank Level Control Valve Failure
14.4.7.8.4	Feedwater Heater High Level Dump Isolation Failure
14.4.7.9.4	Gas Decay Tank Rupture
14.4.7.9.5	Containment Isolation Valve Failure
14.4.7.9.8	Auxiliary Building Fires

D. TEST SCHEDULE - YEAR 3

14.3.3.2	Pump Handler Test
14.3.4.10	Containment and Containment Spray System Test
14.3.4.14	Feedwater Heaters, Vents, & Drains System Test

14.3.4.18	Diesel Generator System Test
14.3.4.22	Steam Dump Control System Test
14.3.4.5	Pressurizer Relief Tank System Test
14.3.4.8	Safety Injection System Test
14.3.6.1	Electrical Distribution Test
14.3.6.3	Electrical Loading Test
14.4.6.1	Startup Test-Initial Criticality & Low Power Test
14.4.7.10.1	Source Range Channel Failure
14.4.7.10.4	Intermediate Range Channel Failure
14.4.7.11.1	Pressurizer Spray Valve Failure
14.4.7.11.5	Pressure Relief Valve Failure
14.4.7.11.8	Pressurizer Level Master Controller Failure
14.4.7.12.1	RCP Thermal Barrier Leak
14.4.7.12.11	RTD Failure
14.4.7.12.15	RCP High Vibration
14.4.7.12.18	Variable RCS Boron Concentration
14.4.7.12.7	RCP Locked Rotor
14.4.7.13.3	RHR Heat Exchanger Tube Leak
14.4.7.13.7	RHR Pump Suction Line Rupture
14.4.7.14.1	Area Monitor Failure
14.4.7.15.10	Step Counter Failure
14.4.7.15.13	MRPI System Failure
14.4.7.15.14	Inadvertent MRPI Alarms
14.4.7.15.2	Dropped Rod
14.4.7.15.6	Rod Drive MG Set Trip
14.4.7.16.1	Inadvertent Containment Isolation
14.4.7.17.1.2	S/G Level Channel Failure - Low
14.4.7.18.2	SIS Failure to Actuate
14.4.7.18.6	Safety Injection Header Leak
14.4.7.19.11	Steamline Break Upstream of Flow Element (Inside Containment)
14.4.7.19.4	Atmospheric Relief Valve Failure
14.4.7.19.7	Extraction Steam Non-Return Valve Failure
14.4.7.19.8	Gland Seal Steam Regulator Failure
14.4.7.2.1	Service Water Pump Trip
14.4.7.2.6	Seal Water Heat Exchanger Tube Leak
14.4.7.20.11	Turbine Control Valve Failure
14.4.7.20.15	Reheater Control Valve Failure
14.4.7.20.3	Turbine Lube Oil Failure
14.4.7.20.7	Turbine Thrust Bearing High Wear
14.4.7.3.2	Main Condenser Tube Leak
14.4.7.3.5	Condensate Bypass Valve Failure
14.4.7.3.6	Condensate Trim Valve Failure
14.4.7.4.10	VCT Level Transmitter Failure

14.4.7.4.14	RMWT Pump Trip
14.4.7.4.18	Charging Pump Speed Controller Failure
14.4.7.4.2	Letdown Line Leak Outside Containment
14.4.7.4.22	Regenerative Letdown Heat Exchanger Tube Leak
14.4.7.4.6	Letdown Orifice Isolation Valve Failure
14.4.7.5.3	Loss of Number 11 Aux Transformer
14.4.7.5.7	Loss of Instrument Bus Supply
14.4.7.6.1	Feedwater Suction Header Break
14.4.7.6.11	Auxiliary Feedwater Pump Failure
14.4.7.6.15	Standby Auxiliary Feedwater Pump Failure
14.4.7.6.18	Feedwater Header Pressure Transmitter Failure
14.4.7.6.7	Feed Regulating Valve Control Failure
14.4.7.7.6	Diesel Generator Breaker Trip
14.4.7.7.9	Diesel Generator Breaker Fails to Close
14.4.7.8.1	Feedwater Heater Tube Leak
14.4.7.9.10	Screenhouse Fires
14.4.7.9.3	Liquid Radwaste Leak

E. TEST SCHEDULE - YEAR 4

14.3.3.3	Controller Handler Test
14.3.4.11	Main Steam and Supply System Test
14.3.4.15	Auxiliary Feedwater System Test
14.3.4.19	Standby Auxiliary Feedwater System Test
14.3.4.2	Incore Instrumentation System Test
14.3.4.24	PPCS Fidelity Test
14.3.4.3	Control Rod Drive and RPI System Test
14.3.4.6	Chemical and Volume Control System Test
14.4.6.1	Startup Test-Initial Criticality & Low Power Test
14.4.7.1.1	Circulating Water Pump Trip
14.4.7.10.2	Noisy Source Range Channel
14.4.7.10.5	Intermediate Range Gamma Compensation Failure
14.4.7.10.7.2	Power Range Channel Failure - Low
14.4.7.10.8	Intermediate Range Blown Fuse
14.4.7.11.2	Pressurizer Pressure Channel Failure
14.4.7.11.6	Pressurizer Safety Valve Failure
14.4.7.12.12	RCP No. 1 Seal Failure
14.4.7.12.17	RVLIS Transmitter Failure
14.4.7.12.8	RCP Oil Reservoir Failure
14.4.7.13.4	RHR Heat Exchanger Bypass Valve Control Failure
14.4.7.14.2	Process Radiation Monitor Failure
14.4.7.15.11	RPI Failure

14.4.7.15.15	Uncoupled Rod Failure
14.4.7.15.3	Stuck Rod
14.4.7.15.7	T _{Ref} Failure in Rod Control
14.4.7.16.5	Reactor Trip Failure
14.4.7.16.7	Failure of ESF Components to Actuate
14.4.7.16.8	Containment Spray Failure to Actuate
14.4.7.18.3	SI Pump Trip
14.4.7.19.1	Steam Flow Channel Failure
14.4.7.19.5	Main Steam Isolation Valve Failure
14.4.7.19.9	Main Steam Safety Valve Failure
14.4.7.2.2	CCW Pump Trip
14.4.7.2.5	CCW Supply Line Break
14.4.7.20.12	Reheat Stop/Intercept Valve Failure
14.4.7.20.14	LP Turbine Relief Valve Failure
14.4.7.20.16	First Stage Pressure Transmitter Failure
14.4.7.20.4	Turbine High Eccentricity
14.4.7.20.8	TSI Failure
14.4.7.3.3	Hotwell Level Transmitter Failure
14.4.7.4.11	Charging Line Leak Outside Containment
14.4.7.4.15	Boric Acid Flow Transmitter Failure
14.4.7.4.23	Letdown Line Safety Valve Fails Open
14.4.7.4.27	Charging Pump Suction Line Failure
14.4.7.4.3	Charging Line Leak Inside Containment
14.4.7.4.7	Letdown Pressure Control Valve Failure
14.4.7.5.4	Loss of Emergency Bus
14.4.7.5.8	Failure of 4 KV Auto Transfer
14.4.7.5.9	Inverter Failover
14.4.7.6.12	AFW Turbine Driven Pump Speed Control Failure
14.4.7.6.16	AFW Pump Discharge Line Rupture
14.4.7.6.8	Feedline Break Outside Containment Downstream of Check Valve
14.4.7.7.3	Main Generator Voltage Regulator Failure
14.4.7.7.7	Failure of Diesel Generator Load Sequencing
14.4.7.7.8	Diesel Generator Autostart Failure
14.4.7.8.2	Heater Drain Tank Pump Trip
14.4.7.8.5	Feedwater Heater Level Control Failure
14.4.7.9.1	Loss of Instrument Air
14.4.7.9.11	Diesel Generator Room Fires
14.4.7.9.12	Containment Building Fires